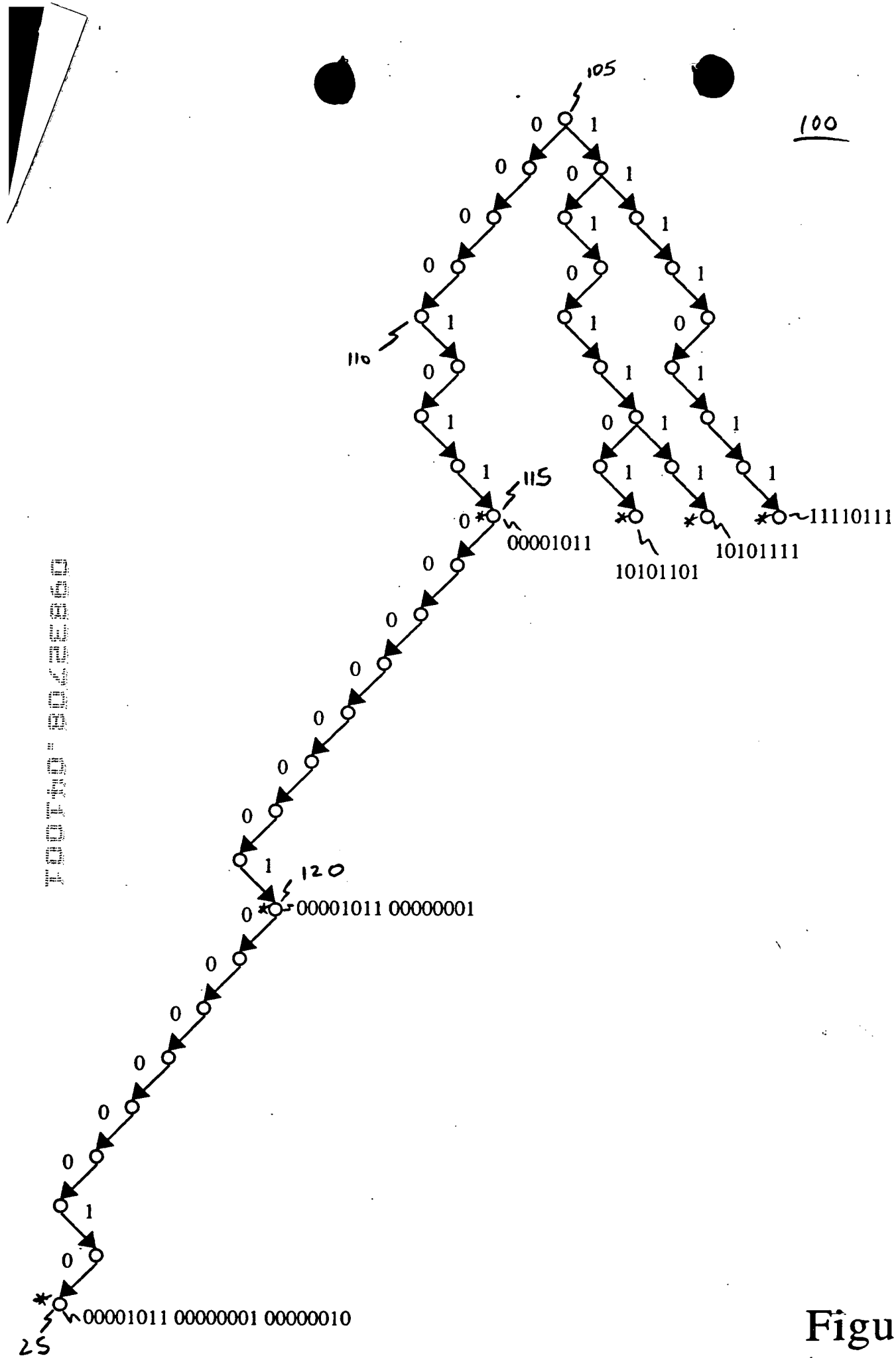

Figure 1
(PRIOR ART)

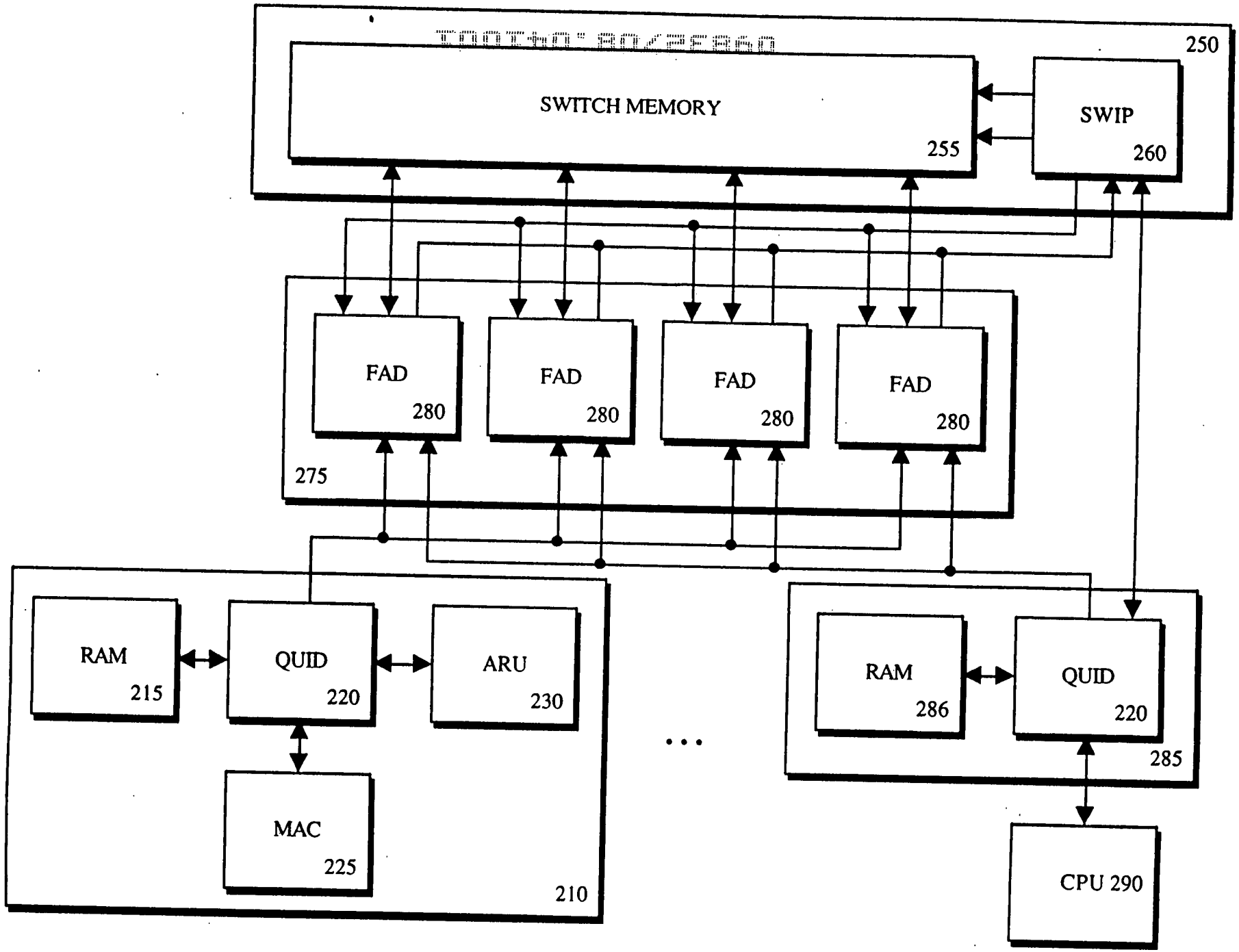
250
SWITCH MEMORY
255
SWIP
260
FAD
280
FAD
280
FAD
280
FAD
280
275
RAM
215
QUID
220
ARU
230
MAC
225
210
RAM
286
QUID
220
285
CPU 290

Figure 2

310	Destination Address:	11.1.2.65	= 00001011.00000001.00000010.01000001
320	Route #1	11.1.2.0/24	= 00001011.00000001.00000010.00000000
330	Route #2	11.1.0.0/16	= 00001011.00000001.00000000.00000000
340	Route #3	11.0.0.0/8	= 00001011.00000000.00000000.00000000

FIG. 3

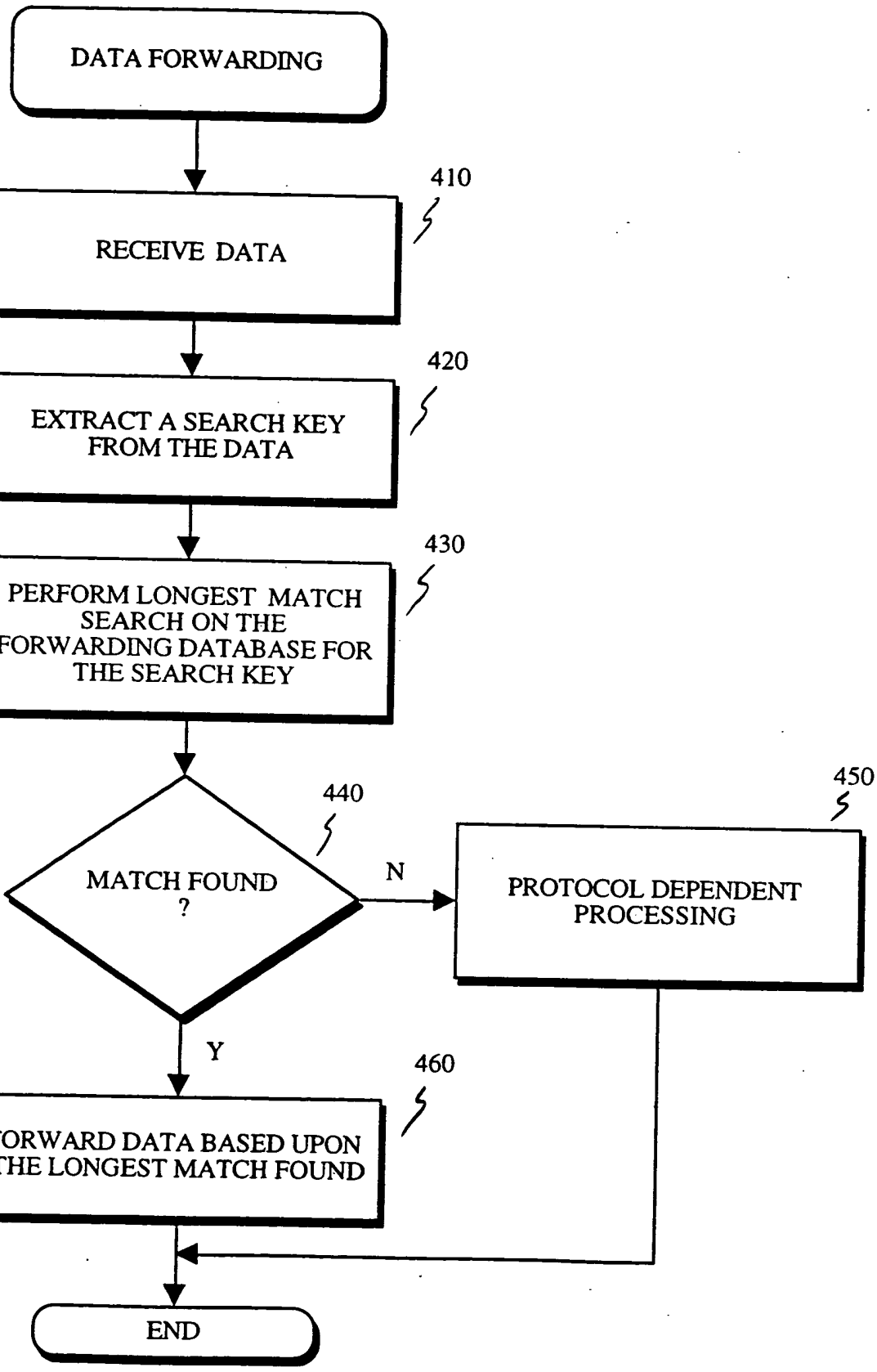
DATA FORWARDING
410
RECEIVE DATA
420
EXTRACT A SEARCH KEY FROM THE DATA
430
PERFORM LONGEST MATCH SEARCH ON THE FORWARDING DATABASE FOR THE SEARCH KEY
440
MATCH FOUND ?
N
450
PROTOCOL DEPENDENT PROCESSING
Y
460
FORWARD DATA BASED UPON THE LONGEST MATCH FOUND
END

Figure 4

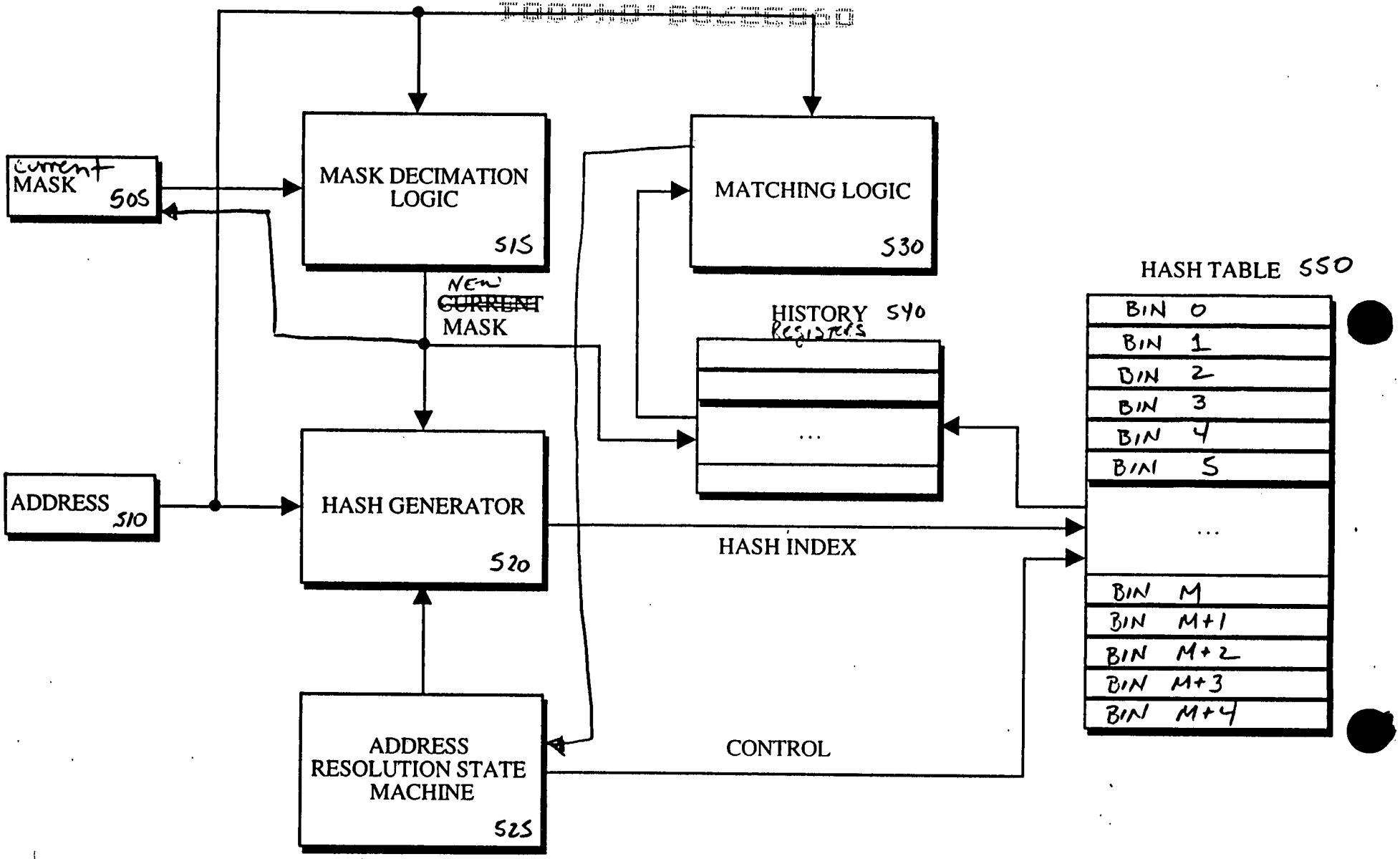
current MASK 505
MASK DECIMATION LOGIC 515
MATCHING LOGIC 530
HASH TABLE 550
NEW CURRENT MASK
HISTORY 540
Registers
BIN 0
BIN 1
BIN 2
BIN 3
BIN 4
BIN 5
...
ADDRESS 510
HASH GENERATOR 520
HASH INDEX
BIN M
BIN M+1
BIN M+2
BIN M+3
BIN M+4
ADDRESS RESOLUTION STATE MACHINE 525
CONTROL

Figure 5

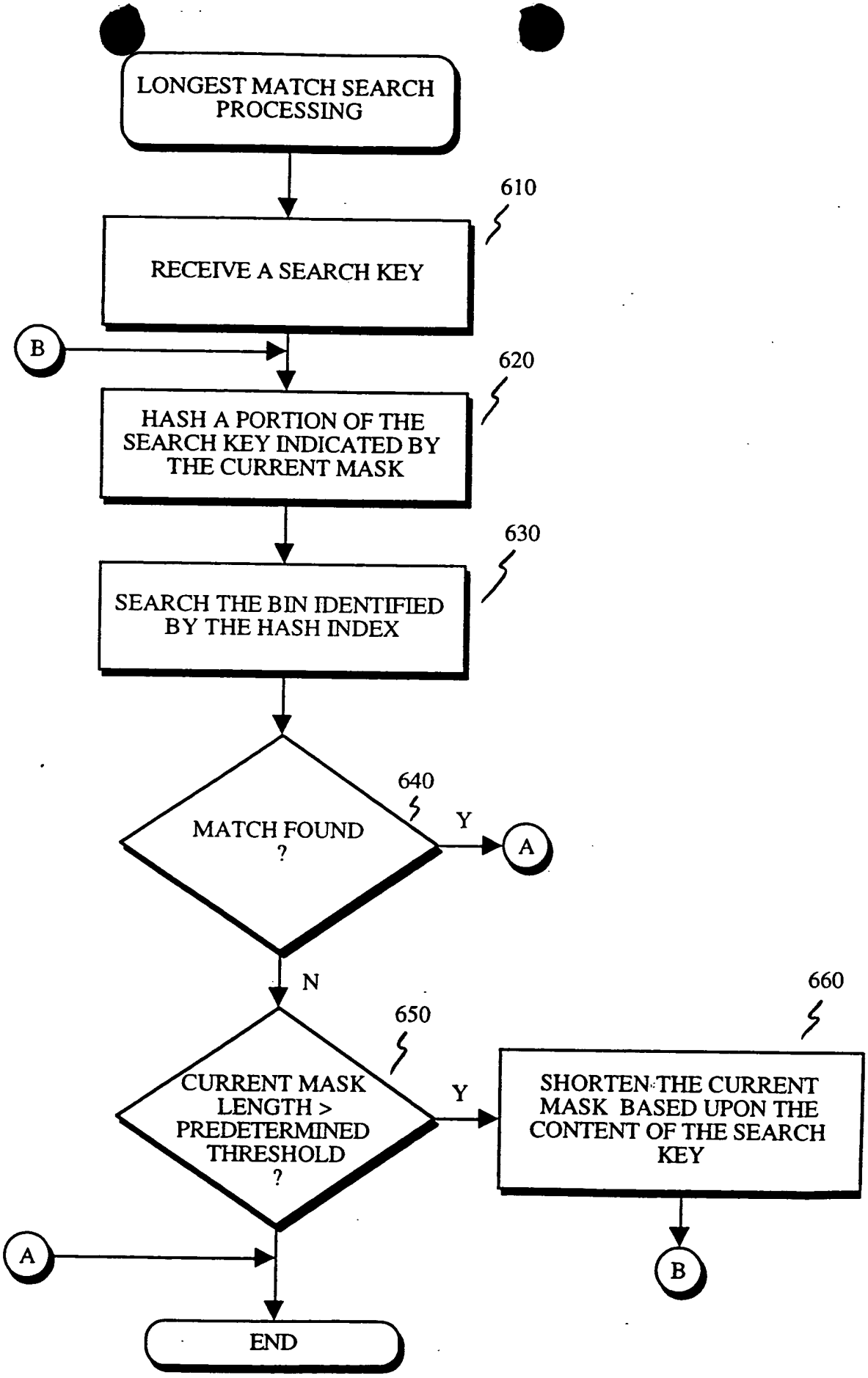
LONGEST MATCH SEARCH PROCESSING
610
RECEIVE A SEARCH KEY
B
620
HASH A PORTION OF THE SEARCH KEY INDICATED BY THE CURRENT MASK
630
SEARCH THE BIN IDENTIFIED BY THE HASH INDEX
640
MATCH FOUND ?
Y
A
N
650
CURRENT MASK LENGTH > PREDETERMINED THRESHOLD ?
Y
660
SHORTEN THE CURRENT MASK BASED UPON THE CONTENT OF THE SEARCH KEY
B
A
END

Figure 6

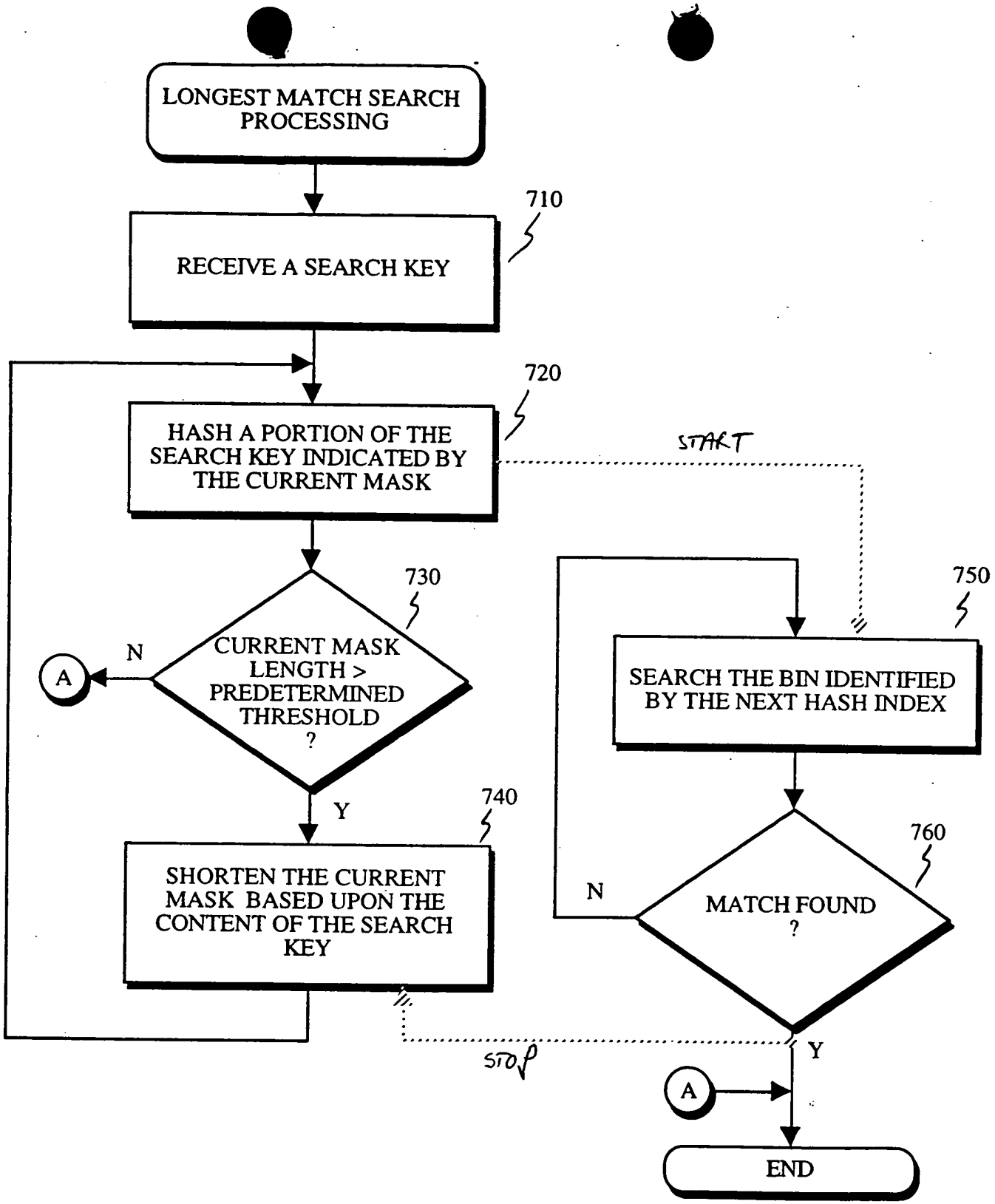
LONGEST MATCH SEARCH PROCESSING
710
RECEIVE A SEARCH KEY
720
HASH A PORTION OF THE SEARCH KEY INDICATED BY THE CURRENT MASK
START
730
CURRENT MASK LENGTH > PREDETERMINED THRESHOLD ?
N
A
Y
740
SHORTEN THE CURRENT MASK BASED UPON THE CONTENT OF THE SEARCH KEY
750
SEARCH THE BIN IDENTIFIED BY THE NEXT HASH INDEX
760
MATCH FOUND ?
N
Y
STOP
A
END

Figure 7

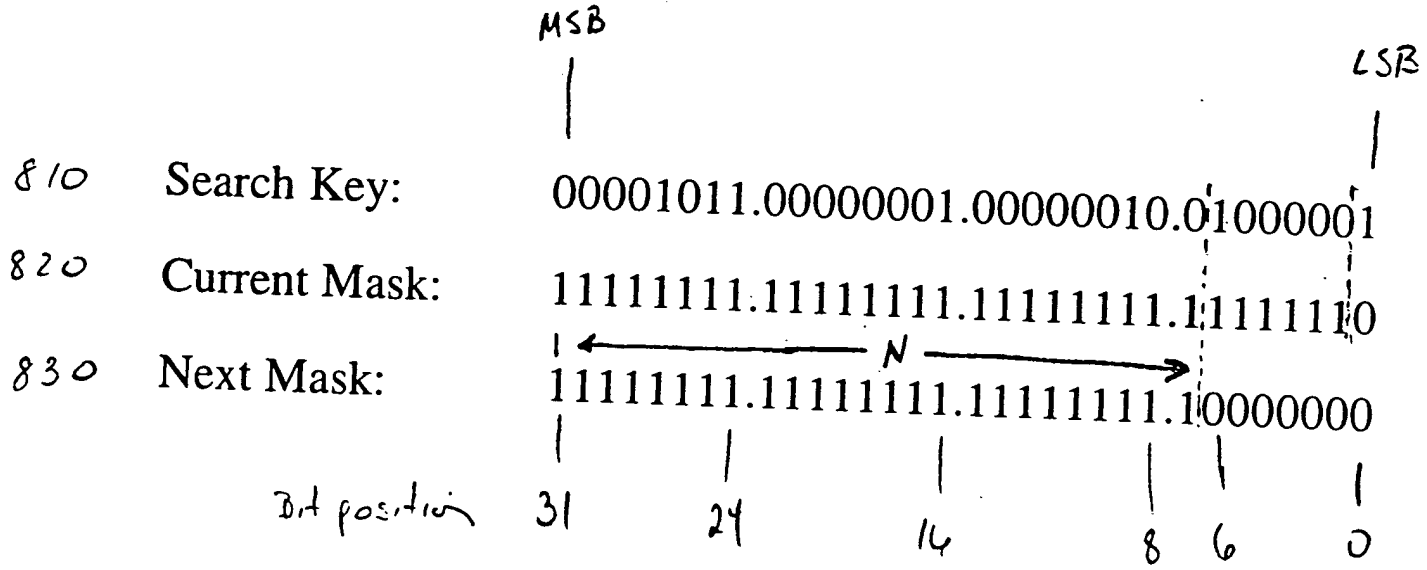
MSB
LSB
810
Search Key:
00001011.00000001.00000010.01000001
820
Current Mask:
11111111.11111111.11111111.11111110
830
Next Mask:
N
11111111.11111111.11111111.10000000
Bit position
31
24
16
8
6
0

FIG. 8

Bit-wise Mask Decimation

Address (hex)	Iteration	Mask (hex)	Masked Address (hex)
0B 01 02 41	1	FF FF FF FF	0B 01 02 41
	2	FF FF FF FE	0B 01 02 40
	3	FF FF FF FC	0B 01 02 40
	4	FF FF FF F8	0B 01 02 40
	5	FF FF FF F0	0B 01 02 40
	6	FF FF FF E0	0B 01 02 40
	7	FF FF FF C0	0B 01 02 40
	8	FF FF FF 80	0B 01 02 00

FIG. 9

Address-sensitive Mask Decimation

Address (hex)	Iteration	Mask (hex)	Masked Address (hex)
0B 01 02 41	1	FF FF FF FF	0B 01 02 41
	2	FF FF FF FE	0B 01 02 40
	3	FF FF FF 80	0B 01 02 00
	4	FF FF 00 00	0B 01 00 00
	5	FF 00 00 00	0B 00 00 00

FIG. 10

Address	...	Mask	
00011000 00010000 00000010 00000000		11111111 11111111 11111111 00000000	1110
00011000 00010000 00000000 00000000		11111111 11111111 00000000 00000000	1115
...			
00011000 00000000 00000000 00000000		11111111 00000000 00000000 00000000	1120

FIG. 11A (PRIOR ART)

Address	...	Mask Length	
00011000 00010000 00000010 00000000		11000	1125
00011000 00010000 00000000 00000000		01000	1130
...			
00011000 00000000 00000000 00000000		00100	1135

FIG. 11B (PRIOR ART)

Address + MASK INFORMATION	...	
00011000 00010000 00000010 10000000 0		1140
00011000 00010000 10000000 00000000 0		1145
...		
00011000 10000000 00000000 00000000 0		1150

FIG. 11C